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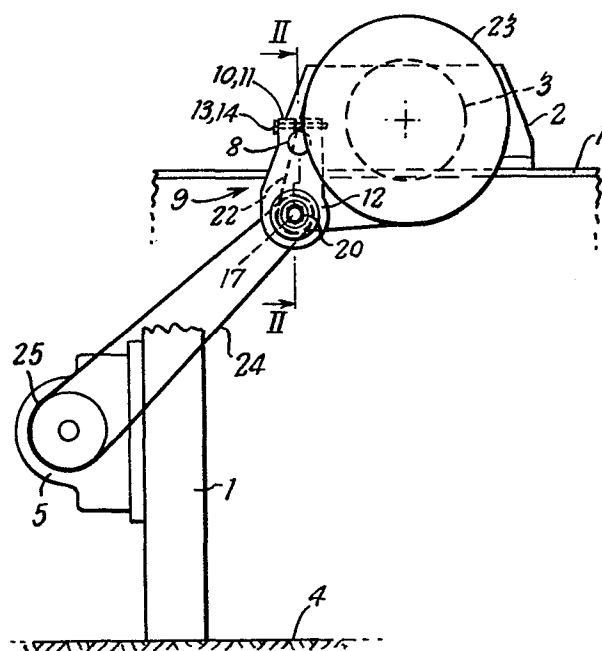
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(54) Improvements relating to carding engines.

(57) A drive system for the main cylinder shaft (3) of a carding engine. A drive motor (5) is mounted remote from the cylinder shaft and drives through a belt (24) an idler shaft (17) parallel and adjacent to the cylinder shaft. A toothed belt (22) forms a slipping transmission from a toothed pulley on the idler shaft to a smooth pulley (23) on the cylinder shaft.



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IMPROVEMENTS RELATING TO CARDING ENGINES

This invention relates to carding engines.

The inertia of the main carding cylinder of a carding engine is very high and considerable problems are experienced in providing a suitable drive for this
5 cylinder. One method currently in use as described in GB-A-917,318 is to mount a special form of drive motor, for example a flat motor, on the card frame adjacent to the main cylinder shaft, the motor output shaft being parallel to the cylinder shaft. The cylinder shaft is driven from
10 the motor shaft by a toothed belt, which engages a toothed sprocket on the motor shaft and passes round a smooth surfaced pulley on the cylinder shaft. When the motor is first run to start up the card, slippage occurs between the toothed belt and the pulley on the cylinder
15 shaft, the degree of slippage gradually decreasing as the main cylinder accelerates. Once the working speed of the cylinder is reached the drive runs with little or no slipping. Thus, the high inertia cylinder can be accelerated through a simple slipping drive without the need for
20 expensive specially designed couplings. However, the saving in the cost of the transmission system is completely negated by the special design of motor that is necessary for this system. Space limitations impose stringent design considerations on such motors and it is extremely
25 difficult to provide at reasonable cost motors of adequate

power, particularly for high speed carding. Furthermore, the positioning of the motor in the very restricted space that is available renders difficult the fixing of the motor so that its shaft is accurately parallel to the cylinder shaft, causes problems in the provision of power supply to, and control means for, the motor, and makes it extremely difficult to provide a multi-speed drive to the cylinder. Additionally, heat generated by the motor can affect critical settings of parts of the carding engine in the cylinder region. The invention seeks to overcome these problems.

According to the present invention a carding engine has a drive system for the main cylinder shaft thereof that comprises a drive motor remote from the cylinder shaft, an idler shaft parallel to the cylinder shaft and adjacent thereto, first transmission means from the motor to the idler shaft and a slipping belt transmission from a toothed pulley on the idler shaft to a smooth pulley on the cylinder shaft.

The invention thus solves the problems associated with earlier card drives in a deceptively simple way, by the provision of an idler shaft adjacent to the cylinder shaft and by driving the idler shaft from a remotely positioned motor. Many advantages are realised with this arrangement. The motor may desirably be mounted at a lower part of the frame or be floor-standing. There are thus very few restrictions on the size and type of motor than can be used and motor costs can be very considerably reduced. Motor pulleys are easily accessible and can readily be changed to change the cylinder speed. Heat generated by the motor can easily be dissipated without adversely affecting card settings. The transmission means from the motor to the idler shaft may be a simple flat belt, and the advantage of the slipping drive is not sacrificed, such drive occurring between the idler shaft and the cylinder shaft. Thus, the overall drive system may be constructed to be both

much cheaper and at least as efficient as conventional systems.

Preferably the idler shaft is rotatably mounted in bearings supported by a carrier that is mounted on
5 the bearing housing of the cylinder shaft. Using the cylinder shaft bearing housing in this way simplifies the positioning of the idler shaft accurately parallel to the cylinder shaft. The mounting of the carrier on the cylinder shaft bearing housing may be a pivotal
10 mounting about an axis that is also parallel to the axis of the cylinder shaft, in order to facilitate adjustment of the idler shaft relative to the cylinder shaft, means being provided for releasably locking the carrier in position relative to the bearing housing. The idler
15 shaft may be subject to a resilient bias arrangement in order to ensure that tension in the drive belt between the idler shaft and cylinder shaft can be properly set.

A drive system according to the invention is not only suitable for new carding engines, but forms a particularly
20 convenient means for converting the main cylinder drive of existing carding engines. For conversions, the idler shaft will conveniently be supported by a self-aligning bearing system supported from the card frame, rather than being supported from the bearing housing of the cylinder
25 shaft. Such system will allow the axis of the idler shaft to be adjusted to lie parallel to the main cylinder shaft.

In order that the invention may be better understood a particular embodiment of a carding engine drive will
30 now be described in more detail, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a schematic side elevation of a main cylinder drive for a carding engine;

Figure 2 is a part elevation, part section on line
35 II-II of part of the drive of Figure 1; and

Figure 3 shows a tensioning device that may be used in the invention.

Referring to Figure 1, part of the main frame of a carding engine is shown at 1, the frame supporting a bearing housing 2 for the drive shaft 3 of the main cylinder (not shown) of the carding engine. The frame 1 is supported from the floor 4 in any suitable manner. An electric motor 5 is mounted on a suitable component of the frame 1.

The bearing housing 2 supports a shaft 8, the axis of which extends parallel to the axis of the cylinder shaft 3. The shaft 8 supports a carrier shown generally as 9 and comprising side members 10 and 11 which are integral at their lower ends with a bushing 12. At the upper end, each side member is split and embraces the shaft 8. The split ends can be pulled together by bolts 13 and 14 respectively to secure the carrier in any required angular alignment to the shaft 8. The bushing 12 supports two spaced bearings 15 and 16. An idler shaft 17 is journaled in the bearings 15 and 16, with its axis parallel to the axis of the shafts 8 and cylinder shaft 3. Suitable locating shoulders and circlips hold the idler shaft 17 and bearings axially in position relative to the carrier 9. A cover plate 17a allows access to the bearing assembly.

The idler shaft carries at its outer end two pulleys, a toothed inner pulley 18 and a smooth surfaced outer pulley 19. Both pulleys are secured on the shaft and are releasably held in position by a bolt 20 threaded into the axial end of the idler shaft and a washer 21 engaged in a recess in the outer surface of the pulley 19. A toothed belt 22 extends around the toothed inner pulley 18 and also around a smooth surfaced pulley 23 secured to rotate with the drive shaft 3. A flat drive belt 24 extends from the outer pulley 19 to a drive pulley 25 of the motor 5.

If desired, the apparatus may include a belt tensioning device 26 as shown in Figure 3, incorporating a threaded guide 27 pivotally supported at 28 on the frame

of the carding machine and passing through an opening in an extension 29 of that carrier. A compression spring 30 surrounds the guide 27 and lies between end washers 31, 32. A nut 33 threaded onto the guide 27 lies behind
5 washer 31, and the washer 32 bears on the extension 29. By adjusting the nut 33 the spring can be pre-loaded as required, so setting the belt 22 at a required tension. After setting of belt tension, either using the device of Figure 3, or manually if such device is omitted, the
10 carrier is locked to the shaft 8 by tightening the bolts 13 and 14.

In operation, the motor 5 drives the idler shaft 17 by way of the flat belt 24. The idler shaft 17 in turn transmits the drive to the cylinder shaft 3 by way of the
15 toothed belt 22. During starting of the carding engine the toothed belt 22 slips on the smooth surface of the pulley 23 while being driven positively by the toothed pulley 18 on the idler shaft 17. Such slippage is gradually reduced as the main cylinder is accelerated until, at full
20 operating speed, there is little or no slippage in the transmission.

It will be seen that the only transmission equipment necessary in the immediate vicinity of the drive shaft is the small idler shaft and its carrier. The motor itself
25 is positioned remote from the drive shaft and there is thus little restraint on the choice of the design, size and power of the motor that may be used. Furthermore, it is an extremely straight-forward matter to provide the electrical supply to the motor. With this card system all high voltage
30 electrics can thus be located in the same area adjacent to the electrical cabinet. Change of speed can be effected by changing any of the pulleys in the transmission system desirably one of those carried by the idler shaft. Reversal of the drive can be achieved simply by reversing
35 motor polarity by suitable switch means.

It will be understood that there are other ways in which an idler shaft can be supported by a carrier from the cylinder shaft bearing housing, and indeed it is not essential for support to be from that housing.

- 5 Support could alternatively be from some part of the frame, for example by way of self-aligning bearings to ensure that the axes of the idler shaft and cylinder shaft are parallel. Tensioning means for the idler shaft are not essential, and if present may be other than the
- 10 tensioning system 26 (shown in Figure 3). The exact location of the motor may, of course, be selected to suit the carding engine concerned. Drive for other elements of the carding engine may be taken from the main cylinder shaft or from the idler shaft in conventional manner.

CLAIMS:

1. A carding engine having a main cylinder supported by a cylinder shaft, and a drive system for the cylinder shaft that comprises a drive motor remote from the cylinder shaft, an idler shaft parallel to the cylinder shaft and
5 adjacent thereto, first transmission means from the motor to the idler shaft and a slipping belt transmission from a toothed pulley on the idler shaft to a smooth pulley on the cylinder shaft.
2. A carding engine according to claim 1 in which
10 the idler shaft is rotatably mounted in bearings supported by a carrier that is mounted on a bearing housing for the cylinder shaft.
3. A carding engine according to claim 2 in which the carrier is mounted on the bearing housing for pivotal
15 movement about an axis parallel to the axis of the cylinder shaft, and means are provided for releasably locking the carrier in position relative to the bearing housing.
4. A carding engine according to claim 2 or claim 3 and including means for biasing the carrier so that the
20 idler shaft is urged away from the cylinder shaft in order to tension the slipping belt transmission.

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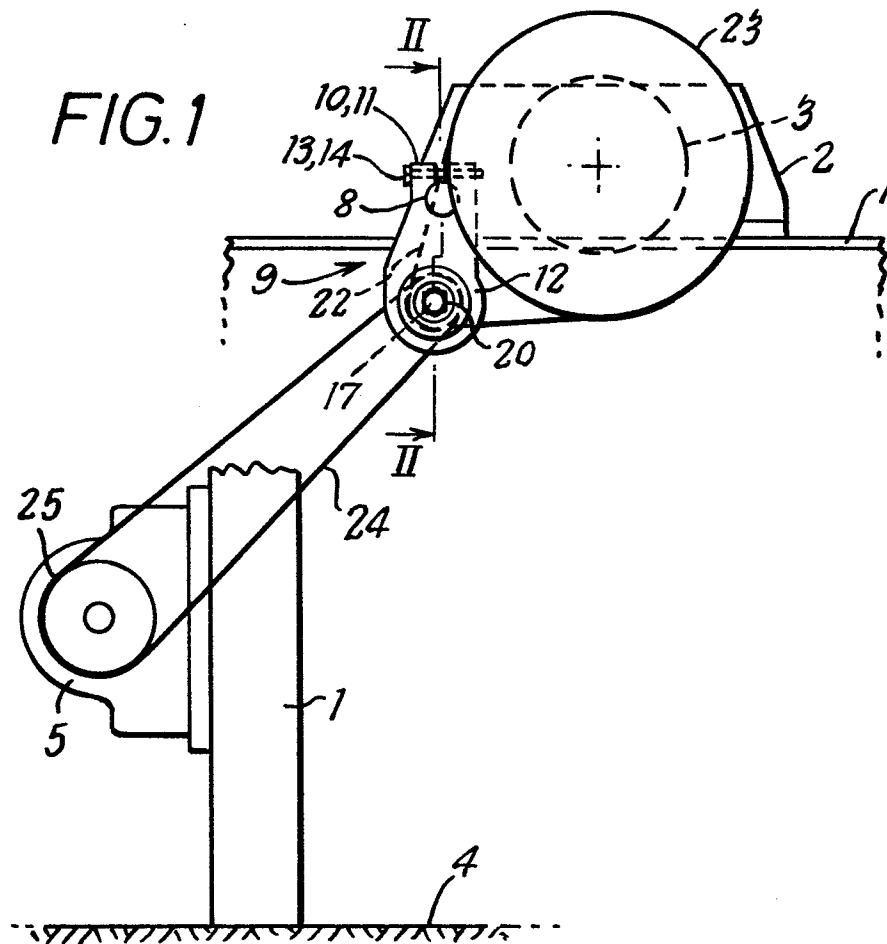
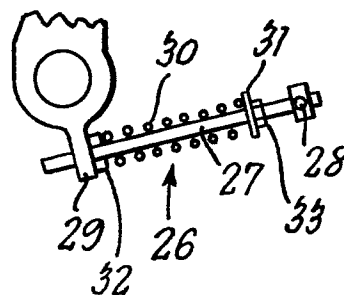
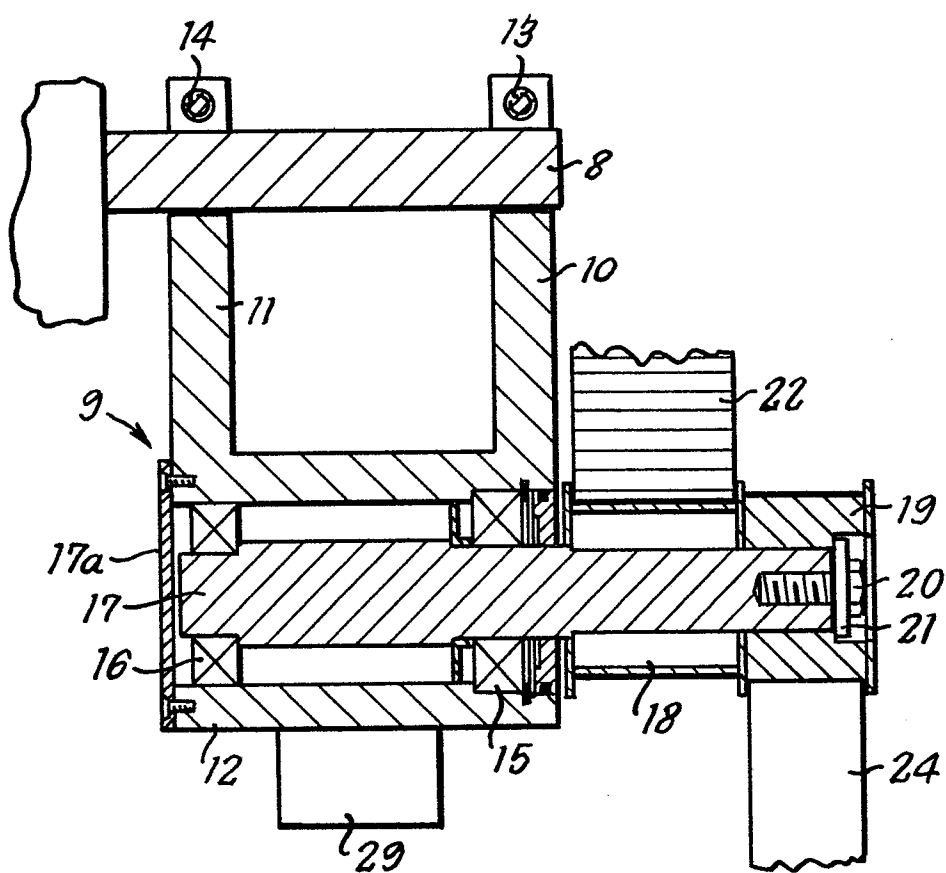
**FIG. 3**

FIG. 2





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EUROPEAN SEARCH REPORT

0097024

Application number

EP 83 30 3325

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	FR-A-1 040 751 (SACM) * Pages 1,2; figure 1 *	1	D 01 G 15/36 F 16 H 7/02
Y,D	--- US-A-3 006 035 (J.K. GUNTER) * Column 2, lines 59-72; column 3, lines 1-53; figures 1-4 *	1,4	
A	--- US-A-2 675 709 (J.W. DOWDY) * Column 2, lines 14-53; figures 1,2 *	1	
A	--- GB-A-1 405 712 (R.A.S. POMEROY) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			D 01 G F 16 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-09-1983	Examiner MUNZER E.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background U : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	